

# RCRA 329 IAC 3-21 CLOSURE PLAN

FOR

EPA Region 5 Records Ctr.



305954

## FOUR STORAGE AREAS

LOCATED AT

JOHNSON CONTROLS, INCORPORATED  
GOSHEN, INDIANA

OCTOBER 1990

JOHNSON  
CONTROLS



COLE ASSOCIATES

ENGINEERS ARCHITECTS PLANNERS

SOUTH BEND INDIANAPOLIS CHESTERTON  
MERRILLVILLE BUCHANAN, MI

**RCRA/329 IAC 3-212 CLOSURE PLAN**  
**for**  
**FOUR WASTE MANAGEMENT UNITS**  
**located at**  
**JOHNSON CONTROLS, INCORPORATED**  
  
**GOSHEN, INDIANA**

**PREFACE**

This closure plan has been prepared in accordance with the requirements of the Indiana Administrative Code, Title 329: Solid Waste Management Regulations, and the Environmental Protection Agency RCRA Hazardous Waste Regulations, 40 CFR 265. It identifies all steps necessary to close the four former waste management units (WMUs) at the Johnson Controls, Goshen, Indiana site.

A post-closure plan has not been prepared because Johnson Controls has removed all hazardous waste and hazardous waste constituents from the WMUs prior to closure.

Johnson Controls will maintain an on-site copy of the approved closure plan and all revisions of the plan until the certification of closure completeness has been submitted and accepted by the Indiana Department of Environmental Management (IDEM). Upon completion of closure, Johnson Controls will submit to the IDEM certification that the facility has been closed in accordance with the approved closure plan. Certification will be provided by both Johnson Controls and an independent, registered professional engineer, using the certification provided in Appendix D.

***I. DESCRIPTION OF FACILITY***

The Johnson Controls, Inc. Goshen, Indiana facility is part of the Control Products Division (SIC Code 3822), and manufactures some 5,000 different control products for the heating, air-conditioning and refrigeration market. The product line includes electronic motor actuators and controllers, as well as micro electronic setback thermostats. The Part A RCRA permit for the facility (IND009549593) is provided in Appendix A. A topographic vicinity map of the facility is shown in Figure 1.

All the hazardous waste was removed from four WMUs. No records are available which would indicate the total quantity of each waste stored at these four sites while they were in use.

## II. DESCRIPTION OF WASTE MANAGEMENT UNITS (WMU) TO BE CLOSED

There are four hazardous waste management units (WMUs) to be closed under this closure plan. See the Site Plan (Figure 2). These sites were briefly described in the preamble and further described herewith, as follows:

WMU #1: Building No. 1 was a 32' x 20' wooden building. The structure was demolished in 1981 prior to the construction of the current 30' x 50' concrete block storage building. Figure 3 shows the enlarged site plan for this area. Building No. 1 was used for non-hazardous equipment storage for 15 years, from 1966 to 1981. Hazardous materials were never stored in this building. It was used to store a tractor and packaged water softener salt. On the west side of the building No. 1 the pavement was asphalt. The remaining area around the current block building is gravel.

WMU # 2: Building No. 2 was a 14' x 26' wooden building. The structure was demolished in 1981 prior to the construction of the current 30' x 50' concrete block building. Figure 3 shows the enlarged site plan for the area. Building No. 2 was used for hazardous waste for 10 years, from 1971 to 1981. The following wastes were stored in the building :

- \* trichloroethylene waste — F001 S01 [lbs]
- \* 1,1,1 trichloroethane waste — F001 S01 [lbs]

To the west of Building No. 2 the pavement was asphalt and represents the east side of the access drive. The remaining area around the current building is gravel. The current building has a containment curb inside for drum storage.

WMU #3: The 300 square-foot storage tank area contained a 1,500-gallon, covered tank which was used to collect used machining oils, xylene, methyl ethyl ketone and methyl alcohol. This unit was located east of the Armco building. See Figure 4 which shows the enlarged site plan.

The storage tank area was used for nine years, from June 1978 to September 1987. The following wastes were stored in the 1,500-gallon tank:

- \* methyl ethyl ketone — F005 S01 [lbs]
- \* xylene — F003 S01 [lbs]
- \* methyl alcohol — (not a listed waste)
- \* water-soluble waste cutting oil (not a listed waste)

The current pavement system at this site is concrete. This pavement was constructed in 1988. Prior to 1988, the tank was located on an unpaved, gravel surface.

WMU #4: The northeast corner of the parking area was used temporarily for drum storage of used filter paper and treatment plant sludge. These materials were placed there while awaiting shipment during the construction of the addition to the paint and plate shop. The storage area was approximately 520 square feet and was used for drum storage for nine months, from April 1980 to January 1981. Figure 5 shows the enlarged site plan for this area.

The waste stored in this area was filter press paper and sludge from the metal finishing wastewater pre-treatment plant and classified as F-006 under RCRD. There was no recorded spillage at this location. The surface of this area is gravel.

### **III. CLOSURE PERFORMANCE STANDARDS**

This closure plan has been designed to ensure that the container storage areas are closed in a manner that minimizes the need for further maintenance and controls, and minimizes the post-closure escape of hazardous constituents, leachate, contaminated run-off and decomposition products to the extent necessary to protect human health and the environment. The following sections discuss in detail efforts to be made at the Johnson Controls facility in Goshen, Indiana, to satisfy the closure performance standards.

### **IV. SCHEDULE FOR CLOSURE ACTIVITIES**

Final closure activities are planned for completion at the Johnson Controls facility in 1991. The closure activities presented in this closure plan are for the four WMUs previously described in Section II and located on the east side of the facility. The approximate schedule of activities necessary to complete the closure is presented in Table 1. Closure activities began in 1989.

**TABLE 1**

#### **FINAL CLOSURE FOR WASTE MANAGEMENT UNITS**

Day 1	Submit closure plan to IDEM for approval.
Day 60	Incorporate any comments and additions to plan required by IDEM to obtain approval of closure.
Day 75	Collect background and foreground soil samples. Begin laboratory analysis.
Day 105	Receive analytical results. For the toxic metals, compare foreground and background levels. Determine if areas are contaminated with toxic metals. Review organic constituents results for the presence of any contamination above the detection limit.

- Day 120    Outline areas to be excavated, if required.
- Day 135    Begin excavation of contaminated soil, if required. Manifest and transport to a special waste landfill, if soil is not hazardous waste. Otherwise, if it is hazardous, dispose of soil at a licensed hazardous waste disposal facility.
- Day 150    Re-sample areas to determine if contaminated soil has been removed.
- Day 175    Evaluate analytical results and determine if further excavation is necessary.
- Day 190    Backfill the excavation with sand when area has been decontaminated.
- Day 205    Make repairs to asphaltic pavement, concrete pads and gravel areas, as required by decontamination activities.
- Day 240    Submit Certification of Closure by Johnson Controls, Inc. and Cole Associates, acting as the independent, registered, professional engineer.

#### **IV. INVENTORY REMOVAL AND SOIL SAMPLING, ANALYSIS AND EXCAVATION**

##### **A. Inventory Removal**

- \* The hazardous waste drums stored at WMU #2 and #4, and the 1,500-gallon tank used at WMU #3, were removed to permanent disposal facilities off-site by 1987. The materials stored at WMU #1 were removed in 1981.

##### **B. Status of Facility After Closure**

- \* The facility will generate and store more than 1,000 kg/month of hazardous wastes, but for less than ninety (90) days. See Table 2 for type of waste stored.
- \* Shipments will be made through Great Lakes Environmental Services, Warren, Michigan 48090, MID087478574.
- \* Waste cutting oil held is for pickup in an above-ground tank owned by Berreth Oil. The tank has a two-inch fill cap on top with a vent cap on the opposite end, a bar and lock for security, and a 1-1/2" bottom drain SS valve with lock. The tank is located on a sloped concrete pad with an oil separator for overflow and spill containment.
- \* The present hazardous waste building located at the site of the former WMU #1 and #2 will stay in operation.

TABLE 2  
HAZARDOUS WASTE STORED ON SITE  
STORED FOR SHIPMENT TO DISPOSAL SITE

<u>Waste Description</u>	<u>RCRA Waste No.</u>	<u>Quantity (Pounds)</u>
1. Electroplating Wastewater Treatment Sludge	F006	3000
2. Plating Bath Sludges	F008	1000
3. Waste Halogenated Degreasing Solvent— Trichloroethylene	F001	3000
4. Waste Halogenated Solvent - 1,1,1 Trichloroethane	F002	1500
5. Waste Flammable Liquid NOS - Flux and Thinner	D001	1000
6. Waste Non-Halogenated Solvent - Methyl Ethyl Ketone	F005	1000
7. Waste Halogenated Solvent - Freon	F002	1000
8. Waste Halogenated Solvent - Alcohol	F002	1000
9. Waste Halogenated Solvent - Methylene Chloride	F002	1000
10. Waste Non-Halogenated Solvent - Conathane	F003	500
11. Waste Corrosive Liquid NOS - Caustic Sludge	D002	1500
12. Waste Halogenated Solvent - Methylene Chloride and Paint Chips	F002	1000

### C. Soil Samples

#### 1. Soil Borings

Four soil borings will be drilled at the Goshen facility on the northeast side of the plant in the vicinity of WMU#4 to determine the soil horizons and establish background levels. These borings will be sampled at 0"- 6" and 6"- 12", provided that the soil horizon of the background samples matches the foreground samples (depth and soil type).

#### 2. Foreground Samples

At WMUs #1 and #2, a minimum of six foreground samples will initially be taken from and around the new storage building. The locations are shown on Figure 2.

Soil samples will be taken at 0"- 6" and 6"- 12" depth. The number of samples is based on a grid interval of 14 feet and 12 possible sampling locations. It is proposed to sample 50% of the locations. Samples will be tested for volatile organic compounds (VOCs).

At WMU #3, a minimum of three foreground samples will initially be taken at the site of the former 1,500-gallon storage tank. The locations are shown on Figure 3. Soil samples will be taken at 0"- 6" and 6"- 12". The number of samples is based on a grid interval of five feet and six possible sampling locations. It is proposed to sample 50% of the sample locations and analyze them for VOCs and total petroleum hydrocarbons (TPH).

At WMU #4, a minimum of four foreground samples will initially be taken at the site of used filter paper and plating sludge (F006) drum storage. The locations are shown on Figure 4. Soil samples will be taken at 0" - 6" and 6" - 12" depth. The number of samples is based on a grid interval of 6.5 feet and 8 possible sampling locations. As previously, it is proposed to sample 50% of the possible sampling locations and analyze for the eight toxic metals identified by RCRA.

The samples will be obtained using a drilling rig utilizing a split spoon sampler and a hand auger, using accepted field sampling protocols to obtain representative samples and prevent cross-contamination. All sampling sites will be located by survey with reference to existing surface features. These locations will be plotted to scale to ensure that the sampling points are reproducible.

### 3. Analytical Methodology

The foreground samples collected during the excavation process will be analyzed to determine the extent of excavation that is necessary. Depending upon which WMU is being investigated, samples of soil will be tested for chemical compounds listed in Table 3. The laboratory proposed for all analytical work is Environmental Health Laboratories (EHL), South Bend, Indiana. The proposed analytical methods are given in Table 4, with the detection limits attainable by EHL. They will be used for the initial evaluation of the extent of excavation.

TABLE 3

#### SUMMARY OF PROPOSED ANALYSIS

<u>WMU</u>	<u>Chemical Analysis</u>
1	Organics (VOCs)
2	Organics (VOCs)
3	Organics (VOC) TPH
4	Toxic Metals (RCRA)

Standard quality assurance objectives will be followed for all analysis activities. Additional quality control will involve the demonstration of non-detectable contaminants of interest in trip blanks. Positive trip blank data will be reviewed by the laboratory's quality assurance officer and best professional judgement will be used should the decision involve potential re-sampling of that day's samples. A copy of the Quality Assurance/Quality Control Procedures of EHL are provided in Appendix B. At the completion of soil excavation, verification of decontamination will be done, as required, using the parameters, analytical methods, and method detection limits outlined in the draft guidance document prepared by the Indiana Department of Environmental Management, Office of Solid and Hazardous Waste Management, "Instructions for the Preparation of Closure Plans for Interim Status RCRA Hazardous Waste Facilities — 1988".

#### 4. Foreground Comparison to Detection Limit

Foreground samples that contain a concentration of any organic constituent above laboratory detection limit will be considered contaminated, and will be disposed of at a licensed special waste or hazardous waste facility depending on whether it meets the Toxicity Characteristic Leaching Procedure (TCLP) levels.

Foreground samples containing metal concentrates (total mg/kg) exceeding the background mean plus three standard deviations of the background mean will be considered contaminated.

Samples exceeding background conditions, but below TCLP levels may be disposed of in a licensed special waste landfill. Samples exceeding the TCLP levels will be disposed of at a licensed hazardous waste disposal facility.

TABLE 4

#### LABORATORY METHODOLOGY

<u>Parameter</u>	<u>Laboratory Method*</u>	<u>Detection Limit</u>
<b>Toxic Metals (RCRA)</b>		
Arsenic	Varian Direct Aspiration	500 mg/kg
Barium	7080	30 mg/kg
Cadmium	7130	3 mg/kg
Chromium	7190	5 mg/kg
Lead	7420	100 mg/kg
Mercury	7471	0.2 mg/kg
Selenium	7741	0.3 mg/kg
Silver	7760	5 mg/kg
<b>Organics VOCs</b>	8260	50 - 100 ppb**
TPH	8100	10 ppm

\*Test Methods for Evaluation of Solid Waste: Physical/Chemical Methods, EPA SW 846, 3rd Ed. (1986).

\*\* Varies with compound analyzed.

#### D. Excavation

The extent of soil excavation will be based on the level of contaminants in the soil and the physical limitations of existing buildings. If excavation and decontamination is restricted by permanent structures, these areas will be addressed under the RCRA corrective action provisions (40 CFR 264.01).

The contaminated soil will be transported by a licensed hazardous waste hauler to a licensed special waste or hazardous waste disposal facility, as required.

Any water that enters the excavation and comes in contact with contaminated soil or structures and other liquid in the excavation will be pumped into a licensed hazardous waste vehicle and transported to a licensed hazardous waste treatment facility.

The excavation will be backfilled with clean granular material, graded, and the pavement will be restored.

#### E. Decontamination

All equipment that contacts contaminated soil or structures will be decontaminated by steam cleaning. This be done over the top of a roll-off box and will occur before the equipment leaves the contaminated "hot" zone.

Each person who enters the contaminated area will wear appropriate attire for EPA Level D protection. It is felt that the worst case contamination present will be below levels necessitating EPA Level C protection. A photionization detector (PID) will be used to screen the area prior to laboratory sampling. If, during the sampling program, it is found that contamination levels are higher than expected, the level of protection will be upgraded at that time.

Upon exiting the "hot" zone, all personnel will enter a separate decontamination area at each excavation on a 12' x 12' polyethylene sheet. All personnel leaving the "hot" zone must pass through the following decontamination sequence:

1. Boots and outer gloves will be washed with soapy water followed by water rinsing.
2. Although shower facilities will not be provided on-site, each individual will shower as soon as practical. Handwashing and changing facilities will be provided at the site.
3. All tools will be wiped with rags and rinsed with soapy water.
4. All rinsing solutions will be stored as hazardous waste in a marked drum prior to disposal at an approved treatment/disposal facility.

#### V. CLOSURE COST ESTIMATE

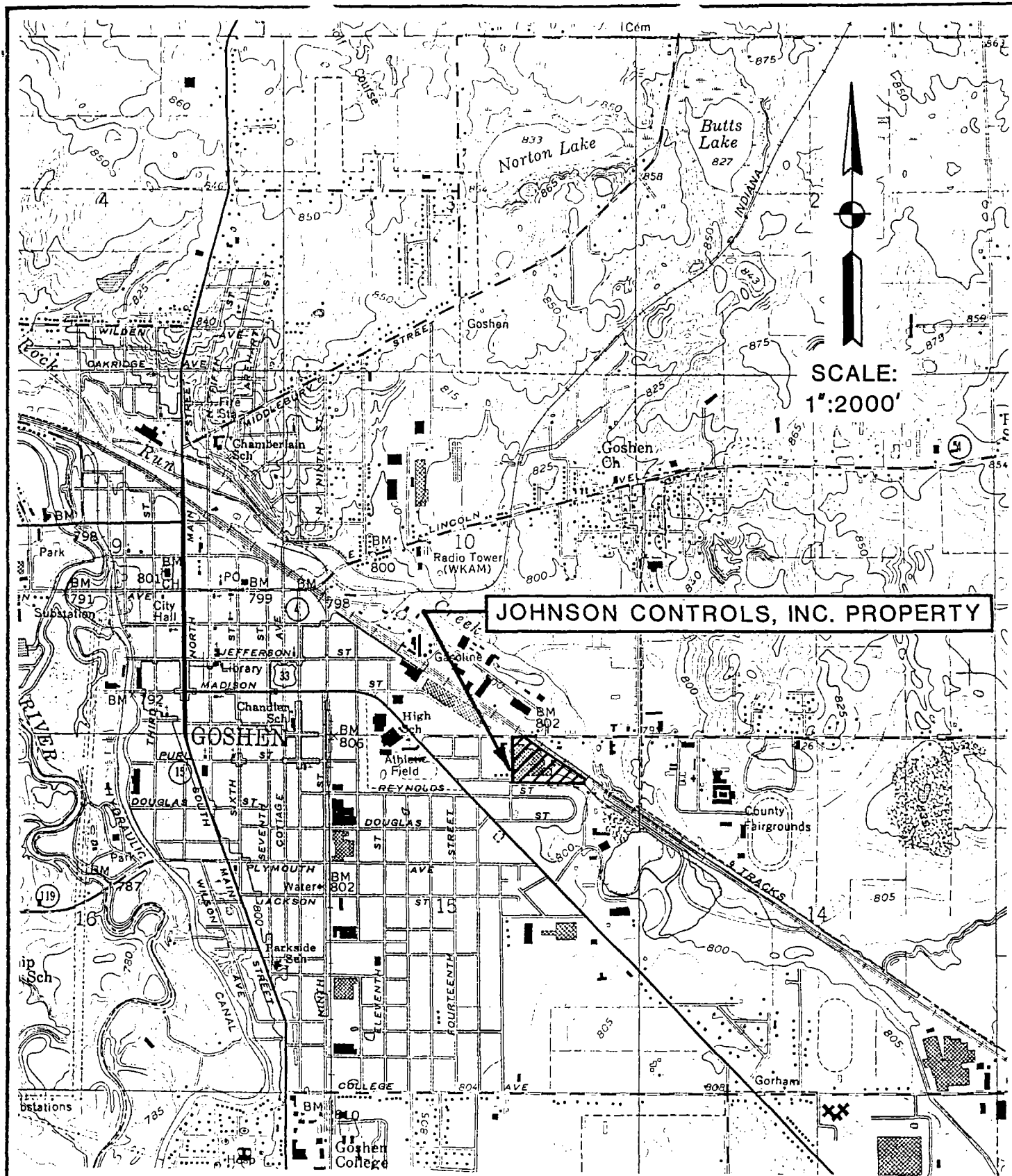
Table 5 outlines the estimated cost of closure.

**TABLE 5**  
**ESTIMATED COST OF CLOSURE**

	<u>Cost</u>	<u>Total</u>
1. Sample soils (labor and equipment)		
Drilling rig	\$ 645.00	
Hand Auger — 17 borings @ \$100	1,700.00	
Concrete Drilling — 3 borings @ \$200	<u>600.00</u>	\$ 2,945.00
2. Analysis of Subsoil		
90 samples — \$210/sample	18,900.00	18,900.00
3. Removal and disposal of non-hazardous concrete, asphalt slabs and roadway		
7.5 cubic yds @ \$30/cu. yd.	225.00	225.00
4. Excavate, transport and dispose of contaminated soils (labor and equipment)		
a. Excavation: 50 cu yds @ \$10/cyd.	500.00	
b. Transportation: 50 cu yds @ \$40/cyd.	2,000.00	
c. Disposal: 50 cu yds @ \$95/cyd.	<u>4,750.00</u>	7,250.00
5. Backfill and Pour Concrete (labor & materials)		
a. Backfill: 50 cu yds @ \$15/cyd.	750.00	
b. Concrete: 10 cu yds @ \$185/cyd.	<u>1,850.00</u>	2,550.00
6. Decontaminate equipment (labor and material)		
10 hours @ \$45/hr.	450.00	450.00
7. Administration		
40 hours @ \$65/hr.	2,600.00	2,600.00
8. Closure Certification (independent professional engineer)		
a. Site Inspection and Plan of Study	2,730.00	
b. Closure Plan and Certification	<u>5,460.00</u>	<u>8,190.00</u>
	Subtotal	\$43,110.00
9. Contingency		4,310.00
10. Administrative Expenses		<u>4,310.00</u>
	TOTAL ESTIMATE	\$51,730.00

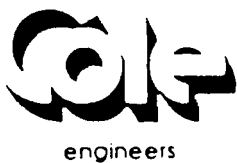
## VI. REFERENCES

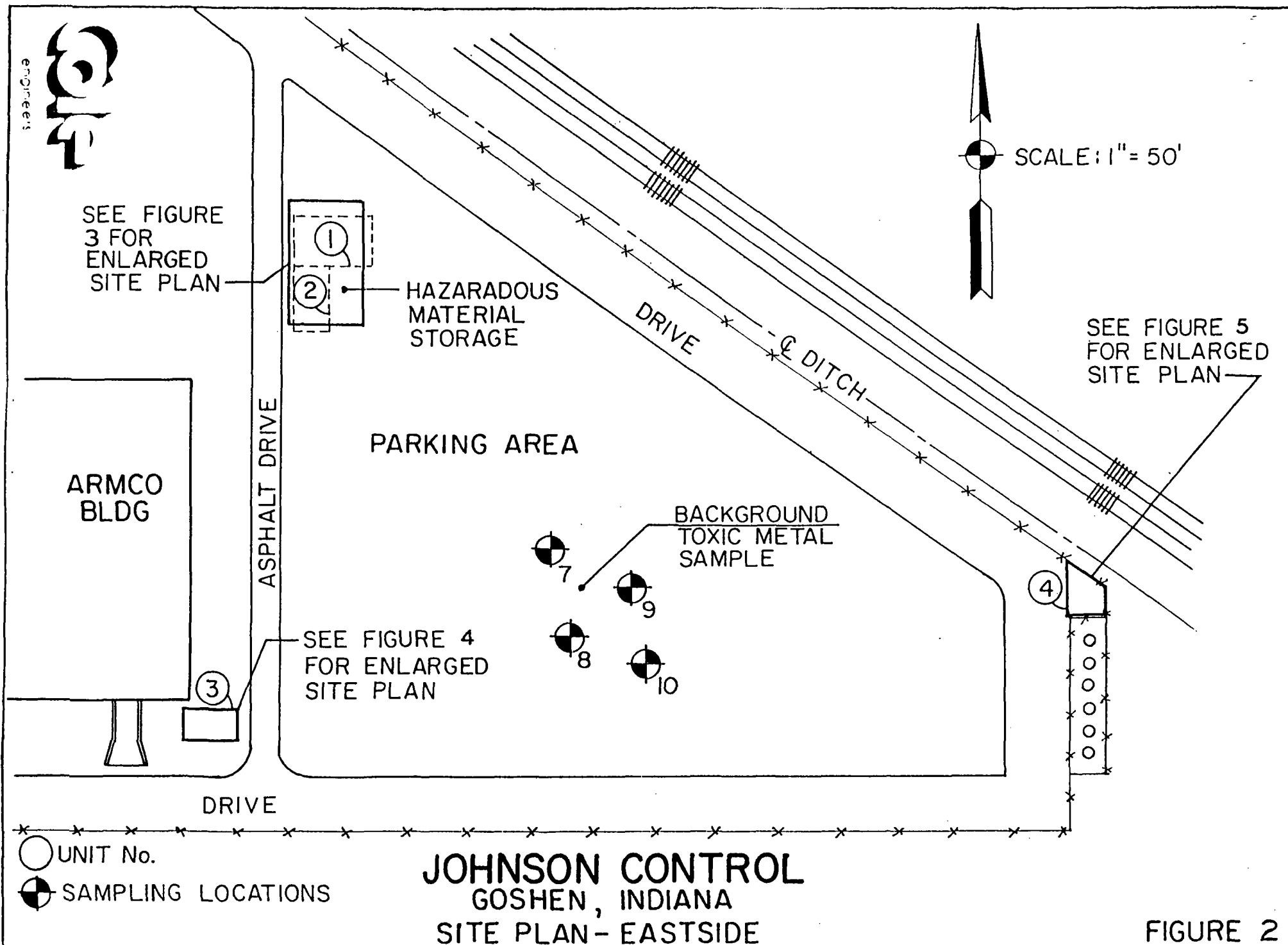
1. Instruction for the Preparation of Closure Plans for Interim Status RCRA Hazardous Waste Facilities, Indiana Department of Environmental Management, Office of Solid and Hazardous Waste Management, 1988.
2. U.S. Environmental Protection Agency, Code of Federal Regulations, Title 40, Part 261: Identification and Listing of Hazardous Waste.
3. Indiana Administrative Code, Title 329, Rule 3-21: Existing Hazardous Waste Facility Standards; Closure and Post-Closure.
4. U.S. Environmental Protection Agency, Test Methods for Evaluation of Solid Waste—Physical/Chemical Methods, EPA SW-846, 3rd Ed. (1986).

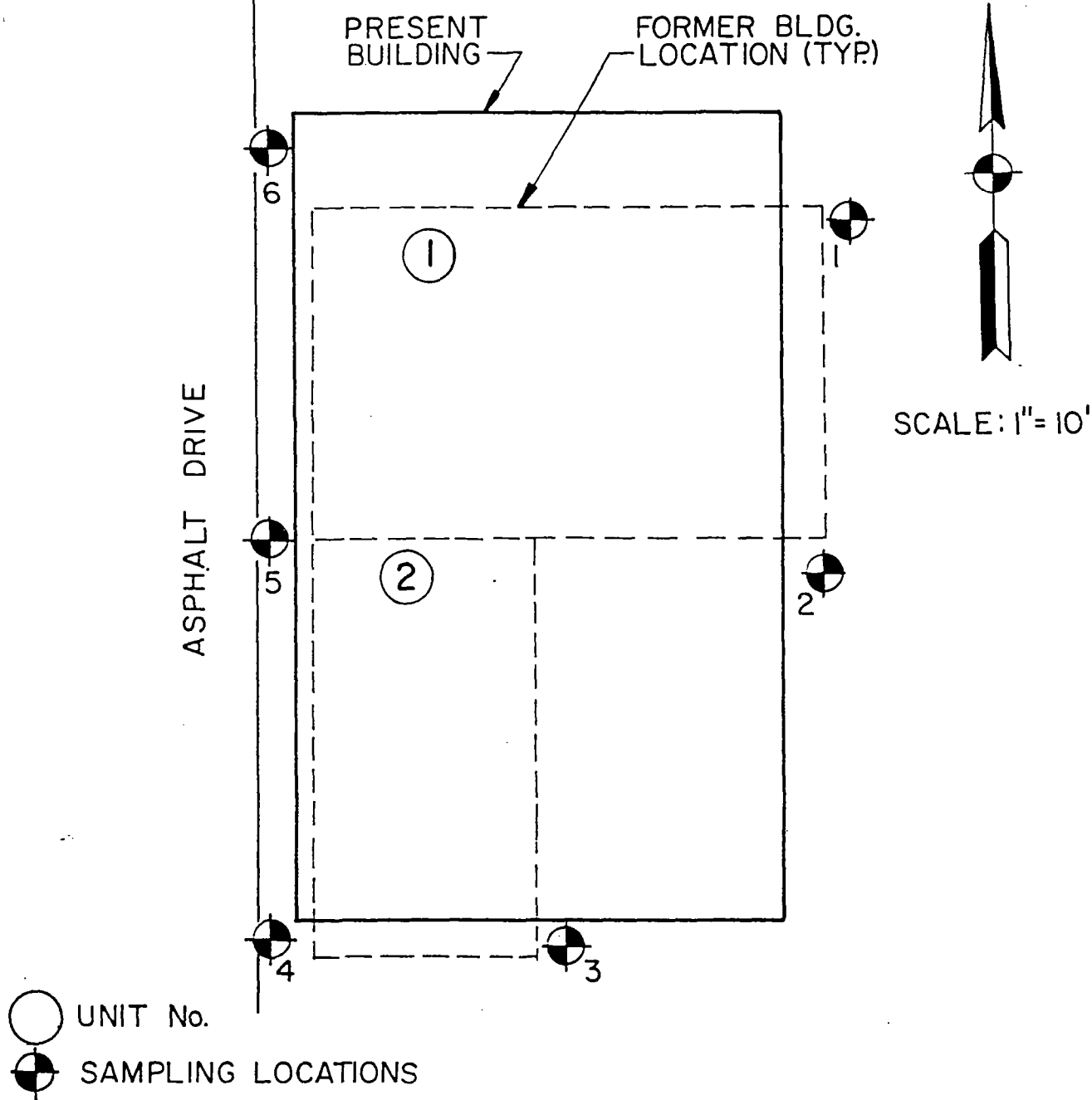


## VICINITY MAP

JOHNSON CONTROLS, INCORPORATED  
GOSHEN, INDIANA







2 BUILDINGS 1-20'x32' & 2-14'x26'  
REMOVED AND REPLACED WITH  
A NEW 30'x50' BUILDING NOV. 1981.

**JOHNSON CONTROL  
WASTE MANAGEMENT UNIT No. 1 & 2  
GOSHEN, INDIANA**

ENLARGED SITE PLAN

ARMCO  
BLDG.

LOADING  
DOCK

3



15



16



17



SCALE: 1" = 20'

SOUTH FENCE LINE



UNIT No.



SAMPLING LOCATIONS

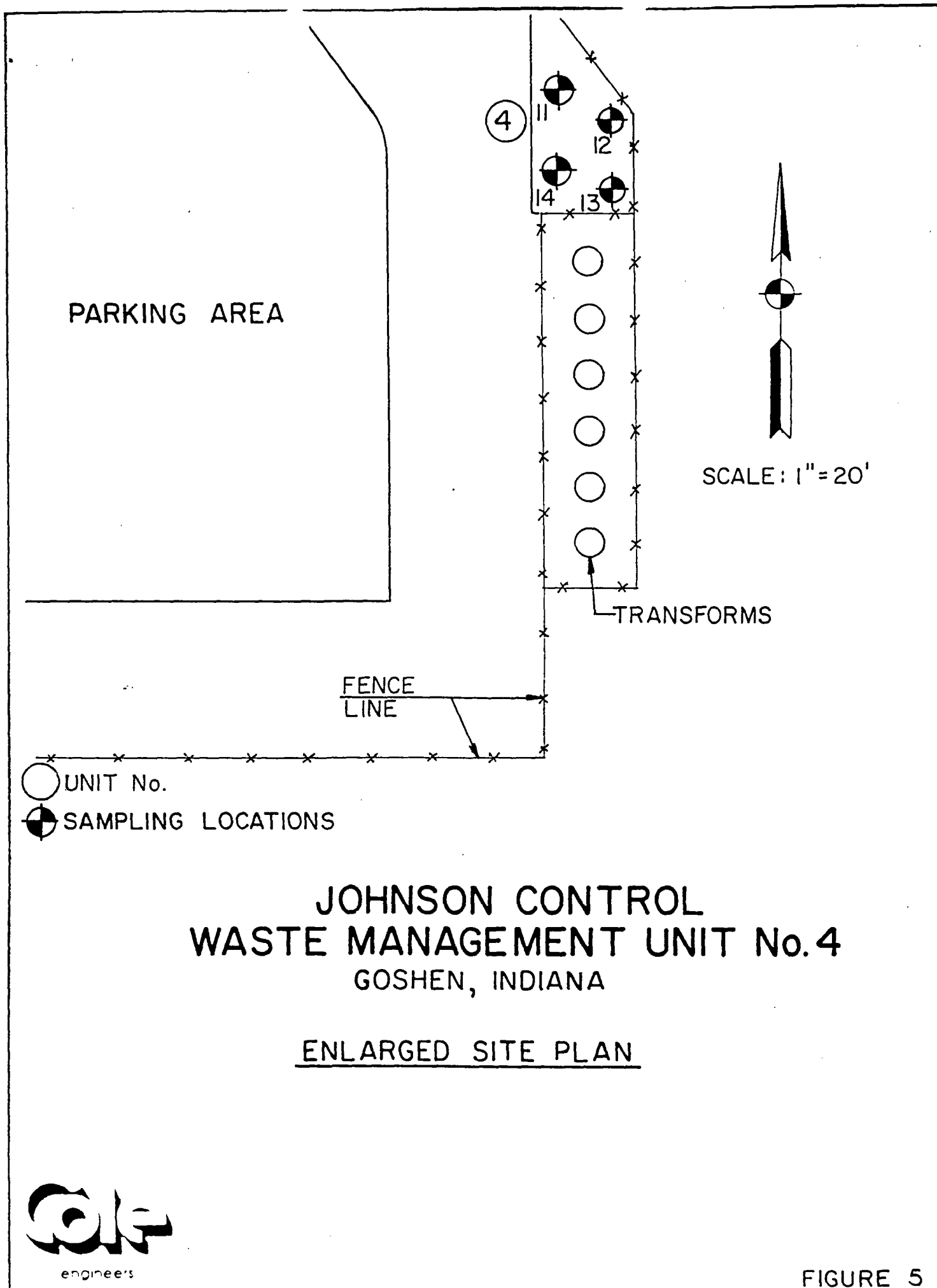
JOHNSON CONTROL  
WASTE MANAGEMENT UNIT No. 3  
GOSHEN, INDIANA

ENLARGED SITE PLAN



engineers

FIGURE 4



## APPENDICES

- APPENDIX A RCRA PART A PERMIT
- APPENDIX B EH LABORATORY QUALITY ASSURANCE/  
QUALITY CONTROL PROCEDURES
- APPENDIX C GRID INTERVAL CALCULATIONS AND  
SAMPLING JUSTIFICATION
- APPENDIX D CLOSURE PLAN CERTIFICATION STATEMENT

## APPENDIX A

### RCRA PART A PERMIT



UNITED STATES  
ENVIRONMENTAL PROTECTION AGENCY  
REGION V

111 West Jackson Blvd.  
CHICAGO, ILLINOIS 60604

*certified mail*

REPLY TO ATTENTION OF:

RCRA ACTIVITIES

JUN 14 1982

Mr. Stanley Leedy  
Johnson Controls Inc  
1302 E. Monroe Street  
Goshen, Indiana 46526

RE: Interim Status Acknowledgement  
FACILITY NAME: Johnson Controls Inc

USEPA ID No. IND009549593

Dear Mr. Leedy:

This is to acknowledge that the U.S. Environmental Protection Agency (USEPA) has completed processing your Part A Hazardous Waste Permit Application. It is the opinion of this office that the information submitted is complete and that you, as an owner or operator of a hazardous waste management facility, have met the requirements of Section 3005(e) of the Resource Conservation and Recovery Act (RCRA) for Interim Status. However, should USEPA obtain information which indicates that your application was incomplete or inaccurate, you may be requested to provide further documentation of your claim for Interim Status. Our opinion will be reevaluated on the basis of this information.

As an owner or operator of a hazardous waste management facility, you are required to comply with the interim status standards as prescribed in 40 CFR Parts 122 and 265, or with State rules and regulations in those States which have been authorized under Section 3006 of RCRA. In addition, you are reminded that operating under interim status does not relieve you from the need to comply with all applicable State and local requirements.

The printout enclosed with this letter identifies the limit(s) of the process design capacities your facility may use during the interim status period. This information was obtained from your Part A Permit application. If you wish to handle new wastes, to change processes, to increase the design capacity of existing processes, or to change ownership or operational control of the facility, you may do so only as provided in 40 CFR Sections 122.22 and 122.23.

As stated in the first paragraph of this letter, you have met the requirements of 40 CFR Part 122.23; your facility may operate under interim status until such time as a permit is issued or denied. This will be preceded by a request from this office or the State (if authorized) for Part B of your application. Please contact Arthur Kawatachi of my staff at (312) 886-7449, if you have any questions concerning this letter or the enclosure.

Sincerely,

Karl J. Klepitsch, Jr., Chief  
Waste Management Branch

Enclosure

cc: Harry A. Mihm      Harold L. Brooks

FACILITY NAME  
 -----  
 JOHNSON CONTROLS INC

EPA ID NUMBER  
 -----  
 IND009549593

FACILITY OPERATOR  
 -----  
 HARRY A MIHM

FACILITY OWNER  
 -----  
 JOHNSON CONTROLS INC

FACILITY LOCATION  
 -----  
 1302 E MONROE STREET  
 GOSHEN IN 46526

PROCESS CODE	DESIGN CAPACITY	UNIT OF MEASURE
-----	-----	-----
T04	35000.00000	U
S01	1551.00000	G
S02	1100.00000	G

-----\*\*KEY\*\*-----

PROCESS	PROCESS CODE	APPROPRIATE UNITS OF MEASURE	* UNIT OF MEASURE	CODE
-----	-----	-----	-----	-----
STORAGE:			* GALLONS	G
-----			* LITERS	L
CONTAINER	S01	G OR L	* CUBIC YARDS	Y
TANK	S02	G OR L	* CUBIC METERS	C
WASTE PILE	S03	Y OR C	* GALLONS PER DAY	U
SURFACE IMPOUNDMENT	S04	G OR L	* LITERS PER DAY	V
DISPOSAL:			* TONS PER HOUR	D
-----			* METRIC TONS\HOUR	W
INJECTION WELL	D79	G, L, U, OR V	* GALLONS\HOUR	E
LANDFILL	D80	A OR F	* LITERS\HOUR	H
LAND APPLICATION	D81	B OR Q	* ACRE-FEET	A
OCEAN DISPOSAL	D82	U OR V	* HECTARE-METER	F
SURFACE IMPOUNDMENT	D83	G OR L	* ACRES	R
TREATMENT:			* HECTARES	Q
-----			* POUNDS\HOUR	J
TANK	T01	U OR V	* KILOGRAMS\HOUR	R
SURFACE IMPOUNDMENT	T02	U OR V	* TONS PER DAY	N
INCINERATOR	T03	D, W, E, OR H	* METRIC TONS\DAY	S
OTHER	T04	J, R, N, S, U, V	*	

EPA		ENVIRONMENTAL PROTECTION AGENCY GENERAL INFORMATION <i>Consolidated Permits Program</i> <small>(Read the "General Instructions" before starting.)</small>		EPA I.D. NUMBER	
GENERAL		EPA I.D. NUMBER		FIND 009549593	
EPA I.D. NUMBER		PLEASE PLACE LABEL IN THIS SPACE		GENERAL INSTRUCTIONS	
III. FACILITY NAME				<p>If a preprinted label has been provided, fill in the designated space. Review the information carefully; if any of it is incorrect, or through it and enter the correct data in appropriate fill-in area below. Also, if any the preprinted data is correct (the area to left of the label space lists the information that should appear), please provide it in proper fill-in area(s) below. If the label is complete and correct, you need not complete items I, III, V, and VI (except VI-B which must be completed regardless). Complete items if no label has been provided. Refer to the instructions for detailed item descriptions and for the legal authorizations under which this data is collected.</p>	
V. FACILITY MAILING ADDRESS					
VI. FACILITY LOCATION					
<b>II. POLLUTANT CHARACTERISTICS</b> <b>INSTRUCTIONS:</b> Complete A through J to determine whether you need to submit any permit application forms to the EPA. If you answer "yes" to any questions, you must submit this form and the supplemental form listed in the parenthesis following the question. Mark "X" in the box in the third column if the supplemental form is attached. If you answer "no" to each question, you need not submit any of these forms. You may answer "no" if your activity is excluded from permit requirements; see Section C of the instructions. See also, Section D of the instructions for definitions of bold-faced terms.					
SPECIFIC QUESTIONS		MARK "X"		SPECIFIC QUESTIONS	
YES NO ATTACHED		YES NO ATTACHED		YES NO ATTACHED	
A. Is this facility a publicly owned treatment works which results in a discharge to waters of the U.S.? (FORM 2A)		X		B. Does or will this facility (either existing or proposed) include a concentrated animal feeding operation, or aquatic animal production facility which results in a discharge to waters of the U.S.? (FORM 2B)	
C. Is this a facility which currently results in discharges to waters of the U.S. other than those described in A or B above? (FORM 2C)		X		D. Is this a proposed facility (other than those described in A or B above) which will result in a discharge to waters of the U.S.? (FORM 2D)	
E. Does or will this facility treat, store, or dispose of hazardous wastes? (FORM 3)		X		F. Do you or will you inject at this facility industrial or municipal effluent below the lowermost stratum containing, within one quarter mile of the well bore, underground sources of drinking water? (FORM 4)	
G. Do you or will you inject at this facility any produced water or other fluids which are brought to the surface in connection with conventional oil or natural gas production, inject fluids used for enhanced recovery of oil or natural gas, or inject fluids for storage of liquid hydrocarbons? (FORM 4)		X		H. Do you or will you inject at this facility fluids for special processes such as mining of sulfur by the Frasch process, solution mining of minerals, in situ combustion of fossil fuel, or recovery of geothermal energy? (FORM 4)	
I. Is this facility a proposed stationary source which is one of the 28 industrial categories listed in the instructions and which will potentially emit 100 tons per year of any air pollutant regulated under the Clean Air Act and may affect or be located in an attainment area? (FORM 5)		X		J. Is this facility a proposed stationary source which is NOT one of the 28 industrial categories listed in the instructions and which will potentially emit 250 tons per year of any air pollutant regulated under the Clean Air Act and may affect or be located in an attainment area? (FORM 5)	
<b>III. NAME OF FACILITY</b> 1. <b>NAME OF FACILITY</b> JOHNSON CONTROLS INC					
<b>IV. FACILITY CONTACT</b> 2. <b>NAME OF CONTACT</b> JOHN G FECTEAU ENV. CONTROL ADMIN 219 533 2111 3. <b>PHONE (area code &amp; no.)</b>					
<b>V. FACILITY MAILING ADDRESS</b> 4. <b>STREET OR R.D. BOX</b> 1302 E MONROE ST 5. <b>CITY OR TOWN</b> GOSHEN <b>STATE</b> IN <b>ZIP CODE</b> 46526					
<b>VI. FACILITY LOCATION</b> 6. <b>STREET OR R.D. BOX</b> 1302 E MONROE ST 7. <b>CITY OR TOWN</b> GOSHEN <b>STATE</b> IN <b>ZIP CODE</b> 46526					
<b>VII. COUNTY NAME</b> ELKHART					
<b>VIII. COUNTY CODE</b> GOSHEN IN 46526					

FORM 1	HAZARDOUS WASTE PERMIT APPLICATION	EPA I.D. NUMBER
RCRA	Consolidated Permits Program (This information is required under Section 3005 of RCRA.)	FIN0009549593

FOR OFFICIAL USE ONLY	
APPLICATION APPROVED	DATE RECEIVED
APPROVED	APPROVED
COMMENTS	

## II. FIRST OR REVISED APPLICATION

Place an "X" in the appropriate box in A or B below (mark one box only) to indicate whether this is the first application you are submitting for your facility or revised application. If this is your first application and you already know your facility's EPA I.D. Number, or if this is a revised application, enter your facility's EPA I.D. Number in Item I above.

A. FIRST APPLICATION (place an "X" below and provide the appropriate date)		2. NEW FACILITY (Complete item below.)	
1. EXISTING FACILITY (See instructions for definition of "existing" facility. Complete item below.)		FOR NEW FACILITIES PROVIDE THE DATE (yr., mo., & day) OPERATION BEGAN OR IS EXPECTED TO BEGIN	
FOR EXISTING FACILITIES, PROVIDE THE DATE (yr., mo., & day) OPERATION BEGAN OR THE DATE CONSTRUCTION COMMENCED (use the boxes to the left)		FOR NEW FACILITIES PROVIDE THE DATE (yr., mo., & day) OPERATION BEGAN OR IS EXPECTED TO BEGIN	
B. REVISED APPLICATION (place an "X" below and complete item 1 above)		2. FACILITY HAS A RCRA PERMIT	
1. FACILITY HAS INTERIM STATUS			

## III. PROCESSES - CODES AND DESIGN CAPACITIES

A. PROCESS CODE - Enter the code from the list of process codes below that best describes each process to be used at the facility. Ten lines are provided for entering codes. If more lines are needed, enter the code(s) in the space provided. If a process will be used that is not included in the list of codes below, then describe the process (including its design capacity) in the space provided on the form (Item III-C).

B. PROCESS DESIGN CAPACITY - For each code entered in column A enter the capacity of the process.  
1. AMOUNT - Enter the amount.  
2. UNIT OF MEASURE - For each amount entered in column B(1), enter the code from the list of unit measure codes below that describes the unit of measure used. Only the units of measure that are listed below should be used.

PROCESS	PRO-CESS CODE	APPROPRIATE UNITS OF MEASURE FOR PROCESS DESIGN CAPACITY	PROCESS	PRO-CESS CODE	APPROPRIATE UNITS OF MEASURE FOR PROCESS DESIGN CAPACITY
Storage:			Treatment:		
CONTAINER (barrel, drum, etc.)	S01	GALLONS OR LITERS	TANK	T01	GALLONS PER DAY OR LITERS PER DAY
TANK	S02	GALLONS OR LITERS	SURFACE IMPOUNDMENT	T02	GALLONS PER DAY OR LITERS PER DAY
WASTE PILE	S03	CUBIC YARDS OR CUBIC METERS	INCINERATOR	T03	TONS PER HOUR OR METRIC TONS PER HOUR
SURFACE IMPOUNDMENT	S04	GALLONS OR LITERS	OTHER (Use for physical, chemical, thermal or biological treatment processes not occurring in tanks, surface impoundments or incinerators. Describe the processes in the space provided; Item III-C.)	T04	GALLONS PER DAY OR LITERS PER DAY
Disposal:					
INJECTION WELL	D79	GALLONS OR LITERS			
LANDFILL	D80	ACRE-FEET (the volume that would cover one acre to a depth of one foot) OR HECTARE-METER			
LAND APPLICATION	D81	ACRES OR HECTARES			
OCEAN DISPOSAL	D82	GALLONS PER DAY OR LITERS PER DAY			
SURFACE IMPOUNDMENT	D83	GALLONS OR LITERS			
UNIT OF MEASURE	UNIT OF MEASURE CODE	UNIT OF MEASURE	UNIT OF MEASURE	UNIT OF MEASURE CODE	UNIT OF MEASURE CODE
GALLONS	G	LITERS PER DAY	ACRE-FEET	A	
LITERS	L	TONS PER HOUR	HECTARE-METER	H	
CUBIC YARDS	Y	METRIC TONS PER HOUR	ACRES	B	
CUBIC METERS	C	GALLONS PER HOUR	HECTARES	Q	
GALLONS PER DAY	U	LITERS PER HOUR			

EXAMPLE FOR COMPLETING ITEM III (shown in line numbers X-1 and X-2 below): A facility has two storage tanks, one tank can hold 200 gallons and the other can hold 400 gallons. The facility also has an incinerator that can burn up to 20 gallons per hour.

C									
1									
2									
3									
4									
5									
6									
7									
8									
9									
10									

Continued from page 2.

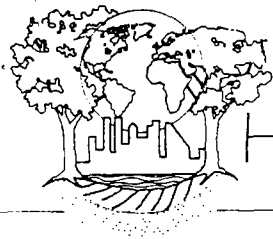
NOTE: Photocopy this page before completing if you have more than 26 wastes to list.

Form Approved OMB No. 158-S80004

EPA I.D. NUMBER (enter from page 1)										FOR OFFICIAL USE ONLY									
W I N D 0 0 9 5 4 9 5 9 3 1										DUP									
IV. DESCRIPTION OF HAZARDOUS WASTES (continued)																			
LINE NO.	A. EPA HAZARD. WASTE NO. (enter code)				B. ESTIMATED ANNUAL QUANTITY OF WASTE	C. UNIT OF MEASURE (enter code)	D. PROCESSES												
	1. PROCESS CODES (enter)						2. PROCESS DESCRIPTION (If a code is not entered in D(1))												
1	F	0	0	1	38,918	P	S	0	1										Disposed of by Licensed Transporter
2	F	0	0	2	46,915	P	S	0	1										Disposed of by Licensed Transporter
3	F	0	0	5	18,810	P	S	0	1										Disposed by Licensed Transporter
4	F	0	0	6	50,156	P	S	0	1										Disposed by Licensed Transporter
5	P	1	0	6	NONE	P													Totally destroyed by Plating Waste Treatment System
6	P	1	2	1	NONE	P													Totally destroyed by Plating Waste Treatment System
7	U	0	0	2	362	P	S	0	1										Disposed by Licensed Transporter
8	U	1	5	4	11,610	P	S	0	1										Disposed by Licensed Transporter
9	U	0	3	1	6,700	P	S	0	1										Disposed by Licensed Transporter
10	U	2	2	0	500	P	S	0	1										Disposed by Licensed Transporter
11	U	2	2	6	19,440	P	S	0	1										Disposed by Licensed Transporter
12	U	2	2	8	13,000	P	S	0	1										Disposed by Licensed Transporter
13	U	0	8	0	9,299	P	S	0	1										Disposed by Licensed Transporter
14	U	2	3	9	3,625	P	S	0	1										Disposed by Licensed Transporter
15																			
16																			
17																			
18																			
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21																			
22																			
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25																			
26																			

## APPENDIX B

### EH LABORATORIES QUALITY ASSURANCE QUALITY CONTROL PROCEDURES



# Environmental Health Laboratories

RECEIVED  
OCT 02 1990

110 S. Hill Street  
South Bend, IN 46617  
(219) 233-4777  
(219) 233-3272  
FAX (219) 233-8207

Cole Associates Inc.

September 27, 1990

Site Manager  
Indiana Department of Environmental Management  
Indianapolis, IN

To whom it may concern,

Environmental Health Laboratories, a division of MAS Technologies, is a privately owned and operated environmental testing laboratory located in South Bend, Indiana.

Environmental Health Laboratories is prepared to perform laboratory analysis, as requested by Mr. Fred Rouse of Cole and Associates, for the RCRA closure at the Johnson Control Manufacturing Facility in Goshen, Indiana. All laboratory analysis will be performed in accordance with SW-846 procedures and the RCRA quality assurance project plan.

Attached is a copy of the RCRA quality assurance project plan. Please contact me if you have any further questions.

Sincerely,

*Paul Bowers*

Paul Bowers  
Quality Assurance Manager

## CHAPTER ONE

### QUALITY CONTROL

#### 1.1 INTRODUCTION

Appropriate use of data generated under the great range of analytical conditions encountered in RCRA analyses requires reliance on the quality control practices incorporated into the methods and procedures. The Environmental Protection Agency generally requires using approved methods for sampling and analysis operations fulfilling regulatory requirements, but the mere approval of these methods does not guarantee adequate results. Inaccuracies can result from many causes, including unanticipated matrix effects, equipment malfunctions, and operator error. Therefore, the quality control component of each method is indispensable.

The data acquired from quality control procedures are used to estimate and evaluate the information content of analytical data and to determine the necessity or the effect of corrective action procedures. The means used to estimate information content include precision, accuracy, detection limit, and other quantifiable and qualitative indicators.

##### 1.1.1 Purpose of this Chapter

This chapter defines the quality control procedures and components that are mandatory in the performance of analyses, and indicates the quality control information which must be generated with the analytical data. Certain activities in an integrated program to generate quality data can be classified as management (QA) and other as functional (QC). The presentation given here is an overview of such a program.

The following sections discuss some minimum standards for QA/QC programs. The chapter is not a guide to constructing quality assurance project plans, quality control programs, or a quality assurance organization. Generators who are choosing contractors to perform sampling or analytical work, however, should make their choice only after evaluating the contractor's QA/QC program against the procedures presented in these sections. Likewise, laboratories that sample and/or analyze solid wastes should similarly evaluate their QA/QC programs.

Most of the laboratories who will use this manual also carry out testing other than that called for in SW-846. Indeed, many user laboratories have multiple mandates, including analyses of drinking water, wastewater, air and industrial hygiene samples, and process samples. These laboratories will, in most cases, already operate under an organizational structure that includes QA/QC. Regardless of the extent and history of their programs, the users of this manual should consider the development, status, and effectiveness of their QA/QC program in carrying out the testing described here.

### 1.1.2 Program Design

The initial step for any sampling or analytical work should be strictly to define the program goals. Once the goals have been defined, a program must be designed to meet them. QA and QC measures will be used to monitor the program and to ensure that all data generated are suitable for their intended use. The responsibility of ensuring that the QA/QC measures are properly employed must be assigned to a knowledgeable person who is not directly involved in the sampling or analysis.

One approach that has been found to provide a useful structure for a QA/QC program is the preparation of both general program plans and project-specific QA/QC plans.

The program plan for a laboratory sets up basic laboratory policies, including QA/QC, and may include standard operating procedures for specific tests. The program plan serves as an operational charter for the laboratory, defining its purposes, its organization and its operating principles. Thus, it is an orderly assemblage of management policies, objectives, principles, and general procedures describing how an agency or laboratory intends to produce data of known and accepted quality. The elements of a program plan and its preparation are described in QAMS-004/80.

Project-specific QA/QC plans differ from program plans in that specific details of a particular sampling/analysis program are addressed. For example, a program plan might state that all analyzers will be calibrated according to a specific protocol given in written standard operating procedures for the laboratory (SOP), while a project plan would state that a particular protocol will be used to calibrate the analyzer for a specific set of analyses that have been defined in the plan. The project plan draws on the program plan or its basic structure and applies this management approach to specific determinations. A given agency or laboratory would have only one quality assurance program plan, but would have a quality assurance project plan for each of its projects. The elements of a project plan and its preparation are described in QAMS/005/80 and are listed in Figure 1-1.

Some organizations may find it inconvenient or even unnecessary to prepare a new project plan for each new set of analyses, especially analytical laboratories which receive numerous batches of samples from various customers within and outside their organizations. For these organizations, it is especially important that adequate QA management structures exist and that any procedures used exist as standard operating procedures (SOP), written documents which detail an operation, analysis or action whose mechanisms are thoroughly prescribed and which is commonly accepted as the method for performing certain routine or repetitive tasks. Having copies of SW-846 and all its referenced documents in one's laboratory is not a substitute for having in-house versions of the methods written to conform to specific instrumentation, data needs, and data quality requirements.

FIGURE 1-1

ESSENTIAL ELEMENTS OF A QA PROJECT PLAN

1. Title Page
2. Table of Contents
3. Project Description
4. Project Organization and Responsibility
5. QA Objectives
6. Sampling Procedures
7. Sample Custody
8. Calibration Procedures and Frequency
9. Analytical Procedures
10. Data Reduction, Validation, and Reporting
11. Internal Quality Control Checks
12. Performance and System Audits
13. Preventive Maintenance
14. Specific Routine Procedures Used to Assess Data Precision, Accuracy, and Completeness
15. Corrective Action
16. Quality Assurance Reports to Management

### 1.1.3 Organization and Responsibility

As part of any measurement program, activities for the data generators, data reviewers/approvers, and data users/requestors must be clearly defined. While the specific titles of these individuals will vary among agencies and laboratories, the most basic structure will include at least one representative of each of these three types. The data generator is typically the individual who carries out the analyses at the direction of the data user/requestor or a designate within or outside the laboratory. The data reviewer/approver is responsible for ensuring that the data produced by the data generator meet agreed-upon specifications.

Responsibility for data review is sometimes assigned to a "Quality Assurance Officer" or "QA Manager." This individual has broad authority to approve or disapprove project plans, specific analyses and final reports. The QA Officer is independent from the data generation activities. In general, the QA Officer is responsible for reviewing and advising on all aspects of QA/QC, including:

- Assisting the data requestor in specifying the QA/QC procedure to be used during the program;

- Making on-site evaluations and submitting audit samples to assist in reviewing QA/QC procedures; and,

- If problems are detected, making recommendations to the data requestor and upper corporate/institutional management to ensure that appropriate corrective actions are taken.

In programs where large and complex amounts of data are generated from both field and laboratory activities, it is helpful to designate sampling monitors, analysis monitors, and quality control/data monitors to assist in carrying out the program or project.

The sampling monitor is responsible for field activities. These include:

- Determining (with the analysis monitor) appropriate sampling equipment and sample containers to minimize contamination;

- Ensuring that samples are collected, preserved, and transported as specified in the workplan; and

- Checking that all sample documentation (labels, field notebooks, chain-of-custody records, packing lists) is correct and transmitting that information, along with the samples, to the analytical laboratory.

The analysis monitor is responsible for laboratory activities. These include:

- Training and qualifying personnel in specified laboratory QC and analytical procedures, prior to receiving samples;

Receiving samples from the field and verifying that incoming samples correspond to the packing list or chain-of-custody sheet; and

Verifying that laboratory QC and analytical procedures are being followed as specified in the workplan, reviewing sample and QC data during the course of analyses, and, if questionable data exist, determining which repeat samples or analyses are needed.

The quality control and data monitor is responsible for QC activities and data management. These include:

Maintaining records of all incoming samples, tracking those samples through subsequent processing and analysis, and, ultimately, appropriately disposing of those samples at the conclusion of the program;

Preparing quality control samples for analysis prior to and during the program;

Preparing QC and sample data for review by the analysis coordinator and the program manager; and

Preparing QC and sample data for transmission and entry into a computer data base, if appropriate.

#### 1.1.4 Performance and Systems Audits

The QA Officer may carry out performance and/or systems audits to ensure that data of known and defensible quality are produced during a program,.

Systems audits are qualitative evaluations of all components of field and laboratory quality control measurement systems. They determine if the measurement systems are being used appropriately. The audits may be carried out before all systems are operational, during the program, or after the completion of the program. Such audits typically involve a comparison of the activities given in the QA/QC plan with those actually scheduled or performed. A special type of systems audit is the data management audit. This audit addresses only data collection and management activities.

The performance audit is a quantitative evaluation of the measurement systems of a program. It requires testing the measurement systems with samples of known composition or behavior to evaluate precision and accuracy. The performance audit is carried out by or under the auspices of the QA Officer without the knowledge of the analysts. Since this is seldom achievable, many variations are used that increase the awareness of the analyst as to the nature of the audit material.

#### 1.1.5 Corrective Action

Corrective action procedures should be addressed in the program plan, project, or SOP. These should include the following elements:

The EPA predetermined limits for data acceptability beyond which corrective action is required;

Procedures for corrective action; and,

For each measurement system, identification of the individual responsible for initiating the corrective action and the individual responsible for approving the corrective action, if necessary.

The need for corrective action may be identified by system or performance audits or by standard QC procedures. The essential steps in the corrective action system are:

Identification and definition of the problem;

Assignment of responsibility for investigating the problem;

Investigation and determination of the cause of the problem;

Determination of a corrective action to eliminate the problem;

Assigning and accepting responsibility for implementing the corrective action;

Implementing the corrective action and evaluating its effectiveness; and

Verifying that the corrective action has eliminated the problem.

The QA Officer should ensure that these steps are taken and that the problem which led to the corrective action has been resolved.

#### 1.1.6 QA/QC Reporting to Management

QA Project Program or Plans should provide a mechanism for periodic reporting to management (or to the data user) on the performance of the measurement system and the data quality. Minimally, these reports should include:

Periodic assessment of measurement quality indicators, i.e., data accuracy, precision and completeness;

Results of performance audits;

Results of system audits; and

Significant QA problems and recommended solutions.

The individual responsible within the organization structure for preparing the periodic reports should be identified in the organizational or management plan. The final report for each project should also include a separate QA section which summarizes data quality information contained in the periodic reports.

Other guidance on quality assurance management and organizations is available from the Agency and professional organizations such as ASTM, AOAC, APHA and FDA.

#### 1.1.7 Quality Control Program for the Analysis of RCRA Samples

An analytical quality control program develops information which can be used to:

Evaluate the accuracy and precision of analytical data in order to establish the quality of the data;

Provide an indication of the need for corrective actions, when comparison with existing regulatory or program criteria or data trends shows that activities must be changed or monitored to a different degree; and

To determine the effect of corrective actions.

#### 1.1.8 Definitions

ACCURACY: Accuracy means the nearness of a result or the mean ( $\bar{x}$ ) of a set of results to the true value. Accuracy is assessed by means of reference samples and percent recoveries.

ANALYTICAL BATCH: The basic unit for analytical quality control is the analytical batch. The analytical batch is defined as samples which are analyzed together with the same method sequence and the same lots of reagents and with the manipulations common to each sample within the same time period or in continuous sequential time periods. Samples in each batch should be of similar composition.

BLANK: A blank is an artificial sample designed to monitor the introduction of artifacts into the process. For aqueous samples, reagent water is used as a blank matrix; however, a universal blank matrix does not exist for solid samples, and therefore, no matrix is used. The blank is taken through the appropriate steps of the process. A reagent blank is an aliquot of analyte-free water or solvent analyzed with the analytical batch. Field blanks are aliquots of analyte-free water or solvents brought to the field in sealed containers and transported back to the

laboratory with the sample containers. Trip blanks and equipment blanks are two specific types of field blanks. Trip blanks are not opened in the field. They are a check on sample contamination originating from sample transport, shipping and from site conditions. Equipment blanks are opened in the field and the contents are poured appropriately over or through the sample collection device, collected in a sample container, and returned to the laboratory as a sample. Equipment blanks are a check on sampling device cleanliness.

CALIBRATION  
CHECK:

Verification of the ratio of instrument response to analyte amount, a calibration check, is done by analyzing for analyte standards in an appropriate solvent. Calibration check solutions are made from a stock solution which is different from the stock used to prepare standards.

CHECK SAMPLE:

*Control*

A blank which has been spiked with the analyte(s) from an independent source in order to monitor the execution of the analytical method is called a check sample. The level of the spike shall be at the regulatory action level when applicable. Otherwise, the spike shall be at 5 times the estimate of the quantification limit. The matrix used shall be phase matched with the samples and well characterized: for an example, reagent grade water is appropriate for an aqueous sample.

ENVIRONMENTAL  
SAMPLE:

An environmental sample or field sample is a representative sample of any material (aqueous, nonaqueous, or multimedia) collected from any source for which determination of composition or contamination is requested or required. For the purposes of this manual, environmental samples shall be classified as follows:

Surface Water and Ground Water;

Drinking Water -- delivered (treated or untreated) water designated as potable water;

Water/Wastewater -- raw source waters for public drinking water supplies, ground waters, municipal influents/effluents, and industrial influents/effluents;

Sludge -- municipal sludges and industrial sludges;

Waste -- aqueous and nonaqueous liquid wastes, chemical solids, contaminated soils, and industrial liquid and solid wastes.

MATRIX/SPIKE-  
DUPLICATE  
ANALYSIS:

In matrix/spike duplicate analysis, predetermined quantities of stock solutions of certain analytes are added to a added to a sample matrix prior to sample extraction/digestion and analysis. Samples are split into duplicates, spiked and analyzed. Percent recoveries are calculated for each of the analytes detected. The relative percent difference between the samples is calculated and used to assess analytical precision. The concentration of the spike should be at the regulatory standard level or the estimated or actual method quantification limit. When the concentration of the analyte in the sample is greater than 0.1%, no spike of the analyte is necessary.

MQL: The method quantification limit (MQL) is the minimum concentration of a substance that can be measured and reported.

PRECISION: Precision means the measurement of agreement of a set of replicate results among themselves without assumption of any prior information as to the true result. Precision is assessed by means of duplicate/replicate sample analysis.

PQL: The practical quantitation limit (PQL) is the lowest level that can be reliably achieved within specified limits of precision and accuracy during routine laboratory operating conditions.

RCRA: The Resource Conservation and Recovery Act.

REAGENT GRADE: Analytical reagent (AR) grade, ACS reagent grade, and reagent grade are synonymous terms for reagents which conform to the current specifications of the Committee on Analytical Reagents of the American Chemical Society.

REPLICATE SAMPLE: A replicate sample is a sample prepared by dividing a sample into two or more separate aliquots. Duplicate samples are considered to be two replicates.

STANDARD CURVE: A standard curve is a curve which plots concentrations of known analyte standard versus the instrument response to the analyte.

SURROGATE: Surrogates are organic compounds which are similar to analytes of interest in chemical composition, extraction, and chromatography, but which are not normally found in environmental samples. These compounds are spiked into all blanks, standards, samples and spiked samples prior to analysis. Percent recoveries are calculated for each surrogate.

WATER: Reagent, analyte-free, or laboratory pure water means distilled or deionized water or Type II reagent water which is free of contaminants that may interfere with the analytical test in question.

## 1.2 QUALITY CONTROL

The procedures indicated below are to be performed for all analyses. Specific instructions relevant to particular analyses are given in the pertinent analytical procedures.

### 1.2.1 Field Quality Control

The sampling component of the Quality Assurance Project Plan (QAPP) shall include:

Reference to or incorporation of accepted sampling techniques in the sampling plan;

Procedures for documenting and justifying any field actions contrary to the QAPP;

Documentation of all pre-field activities such as equipment check-out, calibrations, and container storage and preparation;

Documentation of field measurement quality control data (quality control procedures for such measurements shall be equivalent to corresponding laboratory QC procedures);

Documentation of field activities;

Documentation of post-field activities including sample shipment and receipt, field team de-briefing and equipment check-in;

Generation of quality control samples including duplicate samples, field blanks, equipment blanks, and trip blanks; and

The use of these samples in the context of data evaluation, with details of the methods employed (including statistical methods) and of the criteria upon which the information generated will be judged.

### 1.2.2 Analytical Quality Control

A quality control operation or component is only useful if it can be measured or documented. The following components of analytical quality control are related to the analytical batch. The procedures described are intended to be applied to chemical analytical procedures; although the principles are applicable to radio-chemical or biological analysis, the procedures may not be directly applicable to such techniques.

All quality control data and records required by this section shall be retained by the laboratory and shall be made available to the data requestor as appropriate. The frequencies of these procedures shall be as stated below or at least once with each analytical batch.

#### 1.2.2.1 Spikes, Blanks and Duplicates

##### General Requirements

These procedures shall be performed at least once with each analytical batch with a minimum of once per twenty samples.

##### 1.2.2.1.1 Duplicate Spike

A split/spiked field sample shall be analyzed with every analytical batch or once in twenty samples, whichever is the greater frequency. Analytes stipulated by the analytical method, by applicable regulations, or by other specific requirements must be spiked into the sample. Selection of the sample to be spiked and/or split depends on the information required and the variety of conditions within a typical matrix. In some situations, requirements of the site being sampled may dictate that the sampling team select a sample to be spiked and split based on a pre-visit evaluation or the on-site inspection. This does not preclude the laboratory's spiking a sample of its own selection as well. In other situations the laboratory may select the appropriate sample. The laboratory's selection should be guided by the objective of spiking, which is to determine the extent of matrix bias or interference on analyte recovery and sample-to-sample precision. For soil/sediment samples, spiking is performed at approximately 3 ppm and, therefore, compounds in excess of this concentration in the sample may cause interferences for the determination of the spiked analytes.

##### 1.2.2.1.2 Blanks

Each batch shall be accompanied by a reagent blank. The reagent blank shall be carried through the entire analytical procedure.

##### 1.2.2.1.3 Field Samples/Surrogate Compounds

Every blank, standard, and environmental sample (including matrix spike/matrix duplicate samples) shall be spiked with surrogate compounds prior to purging or extraction. Surrogates shall be spiked into samples according to the appropriate analytical methods. Surrogate spike recoveries shall fall within the control limits set by the laboratory (in accordance with procedures specified in the method or within  $\pm 20\%$ ) for samples falling within the quantification limits without dilution. Dilution of samples to bring the analyte concentration into the linear range of calibration may dilute the surrogates below the quantification limit; evaluation of analytical quality then will rely on the quality control embodied in the check, spiked and duplicate spiked samples.

#### 1.2.2.1.4 Check Sample

Each analytical batch shall contain a check sample. The analytes employed shall be a representative subset of the analytes to be determined. The concentrations of these analytes shall approach the estimated quantification limit in the matrix of the check sample. In particular, check samples for metallic analytes shall be matched to field samples in phase and in general matrix composition.

#### 1.2.2.2 Clean-Ups

Quality control procedures described here are intended for adsorbent chromatography and back extractions applied to organic extracts. All batches of adsorbents (Florisil, alumina, silica gel, etc.) prepared for use shall be checked for analyte recovery by running the elution pattern with standards as a column check. The elution pattern shall be optimized for maximum recovery of analytes and maximum rejection of contaminants.

##### 1.2.2.2.1 Column Check Sample

The elution pattern shall be reconfirmed with a column check of standard compounds after activating or deactivating a batch of adsorbent. These compounds shall be representative of each elution fraction. Recovery as specified in the methods is considered an acceptable column check. A result lower than specified indicates that the procedure is not acceptable or has been misapplied.

##### 1.2.2.2.2 Column Check Sample Blank

The check blank shall be run after activating or deactivating a batch of adsorbent.

#### 1.2.2.3 Determinations

##### 1.2.2.3.1 Instrument Adjustment: Tuning, Alignment, etc.

Requirements and procedures are instrument- and method-specific. Analytical instrumentation shall be tuned and aligned in accordance with requirements which are specific to the instrumentation procedures employed. Individual determinative procedures shall be consulted. Criteria for initial conditions and for continuing confirmation conditions for methods within this manual are found in the appropriate procedures.

##### 1.2.2.3.2 Calibration

Analytical instrumentation shall be calibrated in accordance with requirements which are specific to the instrumentation and procedures employed. Introductory Methods 7000 and 8000 and appropriate analytical procedures shall be consulted for criteria for initial and continuing calibration.

#### 1.2.2.3.3 Additional QC Requirements for Inorganic Analysis

Standard curves used in the determination of inorganic analytes shall be prepared as follows:

Standard curves derived from data consisting of one reagent blank and four concentrations shall be prepared for each analyte. The response for each prepared standard shall be based upon the average of three replicate readings of each standard. The standard curve shall be used with each subsequent analysis provided that the standard curve is verified by using at least one reagent blank and one standard at a level normally encountered or expected in such samples. The response for each standard shall be based upon the average of three replicate readings of the standard. If the results of the verification are not within +10% of the original curve, a new standard shall be prepared and analyzed. If the results of the second verification are not within +10% of the original standard curve, a reference standard should be employed to determine if the discrepancy is with the standard or with the instrument. New standards should also be prepared on a quarterly basis at a minimum. All data used in drawing or describing the curve shall be so indicated on the curve or its description. A record shall be made of the verification.

Standard deviations and relative standard deviations shall be calculated for the percent recovery of analytes from the spiked sample duplicates and from the check samples. These values shall be established for the twenty most recent determinations in each category.

#### 1.2.2.3.4 Additional Quality Control Requirements for Organic Analysis

The following requirements shall be applied to the analysis of samples by gas chromatography, liquid chromatography and gas chromatography/mass spectrometry.

The calibration of each instrument shall be verified at frequencies specified in the methods. A new standard curve must be prepared as specified in the methods.

The tune of each GC/MS system used for the determination of organic analytes shall be checked with 4-bromofluorobenzene (BFB) for determinations of volatiles and with decafluorotriphenylphosphine (DFTPP) for determinations of semi-volatiles. The required ion abundance criteria shall be met before determination of any analytes. If the system does not meet the required specification for one or more of the required ions, the instrument must be retuned and rechecked before proceeding with sample analysis. The tune performance check criteria must be achieved daily or for each 12 hour operating period, whichever is more frequent.

Background subtraction should be straightforward and designed only to eliminate column bleed or instrument background ions. Background subtraction

actions resulting in spectral distortions for the sole purpose of meeting special requirements are contrary to the objectives of Quality Assurance and are unacceptable.

For determinations by HPLC or GC, the instrument calibration shall be verified as specified in the methods.

#### 1.2.2.3.5 Identification

Identification of all analytes must be accomplished with an authentic standard of the analyte. When authentic standards are not available, identification is tentative.

For gas chromatographic determinations of specific analytes, the relative retention time of the unknown must be compared with that of an authentic standard. For compound confirmation, a sample and standard shall be re-analyzed on a column of different selectivity to obtain a second characteristic relative retention time. Peaks must elute within daily retention time windows to be declared a tentative or confirmed identification.

For gas chromatographic/mass spectrometric determinations of specific analytes, the spectrum of the analyte should conform to a literature representation of the spectrum or to a spectrum of the authentic standard obtained after satisfactory tuning of the mass spectrometer and within the same twelve-hour working shift as the analytical spectrum. The appropriate analytical methods should be consulted for specific criteria for matching the mass spectra, relative response factors, and relative retention times to those of authentic standards.

#### 1.2.2.3.6 Quantification

The procedures for quantification of analytes are discussed in the appropriate general procedures (7000, 8000) and the specific analytical methods.

In some situations in the course of determining metal analytes, matrix-matched calibration standards may be required. These standards shall be composed of the pure reagent, approximation of the matrix, and reagent addition of major interferences in the samples. This will be stipulated in the procedures.

Estimation of the concentration of an organic compound not contained within the calibration standard may be accomplished by comparing mass spectral response of the compound with that of an internal standard. The procedure is specified in the methods.

### 1.3 DETECTION LIMIT AND QUANTIFICATION LIMIT

The detection limit and quantification limit of analytes shall be evaluated by determining the noise level of response for each sample in the batch. If analyte is present, the noise level adjacent in retention time to the analyte peak may be used. For wave-length dispersive instrumentation, multiple determinations of digestates with no detectable analyte may be used to establish the noise level. The method of standard additions should then be used to determine the calibration curve using one digestate or extracted sample in which the analyte was not detected. The slope of the calibration curve,  $m$ , should be calculated using the following relations:

$m$  = slope of calibration line

$S_B$  = standard deviation of the average noise level

$MDL = K S_B / m$

For  $K = 3$ ;  $MDL$  = method detection limit.

For  $K = 5$ ;  $MDL$  = method quantitation limit.

### 1.4 DATA REPORTING

The requirement of reporting analytical results on a wet-weight or a dry-weight basis is dictated by factors such as: sample matrix; program or regulatory requirement; and objectives of the analysis.

Analytical results shall be reported with the percent moisture or percent solid content of the sample.

### 1.5 QUALITY CONTROL DOCUMENTATION

The following sections list the QC documentation which comprises the complete analytical package. This package should be obtained from the data generator upon request. These forms, or adaptations of these forms, shall be used by the data generator/reportor for inorganics (I), or for organics (O) or both (I/O) types of determinations.

#### 1.5.1 Analytical Results (I/O: Form I)

Analyte concentration.

Sample weight.

Percent water (for non-aqueous samples when specified).

Final volume of extract or diluted sample.

Holding times (I: Form X).

1.5.2 Calibration (I: Form II; O: Form V, VI, VII, IX)

Calibration curve or coefficients of the linear equation which describes the calibration curve.

Correlation coefficient of the linear calibration.

Concentration/response data (or relative response data) of the calibration check standards, along with dates on which they were analytically determined.

1.5.3 Column Check (O: Form X)

Results of column chromatography check, with the chromatogram.

1.5.4 Extraction/Digestion (I/O: Form I)

Date of the extraction for each sample.

1.5.5 Surrogates (O: Form II)

Amount of surrogate spiked, and percent recovery of each surrogate.

1.5.6 Matrix/Duplicate Spikes (I: Form V, VI; O: Form III)

Amount spiked, percent recovery, and relative percent difference for each compound in the spiked samples for the analytical batch.

1.5.7 Check Sample (I: Form VII; O: Form VIII)

Amount spiked, and percent recovery of each compound spiked.

1.5.8 Blank (I: Form III; O: Form IV)

Identity and amount of each constituent.

1.5.9 Chromatograms (for organic analysis)

All chromatograms for reported results, properly labeled with:

- Sample identification
- Method identification
- Identification of retention time of analyte on the chromatograms.

1.5.10 Quantitative Chromatogram Report (0: Forms VIII, IX, X)

Retention time of analyte.

Amount injected.

Area of appropriate calculation of detection response.

Amount of analyte found.

Date and time of injection.

1.5.11 Mass Spectrum

Spectra of standards generated from authentic standards (one for each report for each compound detected).

Spectra of analytes from actual analyses.

Spectrometer identifier.

1.5.12 Metal Interference Check Sample Results (I: Form IV)

1.5.13 Detection Limit (I: Form VII; 0: Form I)

Analyte detection limits with methods of estimation.

1.5.14 Results of Standard Additions (I: Form VIII)

1.5.15 Results of Serial Dilutions (I: Form IX)

1.5.16 Instrument Detection Limits (I: Form XI)

1.5.17 ICP Interelement Correction Factors and ICP Linear Ranges (when applicable) (I: Form XII, Form XIII).

1.6 REFERENCES

1. Guidelines and Specifications for Preparing Quality Assurance Program Plans, September 20, 1980, Office of Monitoring Systems and Quality Assurance, ORD, U.S. EPA, QAMS-004/80, Washington, DC 20460.

2. Interim Guidelines and Specifications for Preparing Quality Assurance Project Plans, December 29, 1980, Office of Monitoring Systems and Quality Assurance, ORD, U.S. EPA, QAMS-005/80, Washington, DC 20460.

## APPENDIX C

### GRID INTERVAL CALCULATION AND SAMPLING JUSTIFICATION



engineers / architects / planners

JOB Johnson Controls - 24291SHEET NO. 1 OF 1CALCULATED BY FLR DATE 9/28/90CHECKED BY JO DATE 10/4/90

SCALE \_\_\_\_\_

+ Area 1 = 40' x 60' = 2400 SF

$$GI = \frac{\left(\frac{A}{\pi}\right)^{0.5}}{2} = \frac{(2400 \text{ SF})^{0.5}}{\pi} = 13.89'$$

USE GI = 14.00'

\* 12 Grid Points

SAMPLES FROM 6 locations  
used 50% of Sampling Points

$$+ \text{Area 3 } 300 \text{ SF}$$
$$GI = \frac{\left(\frac{A}{\pi}\right)^{0.5}}{2} = \frac{(300)^{0.5}}{\pi} = 4.88'$$

USE GI = 5'0"

\* 6 Grid Points

Sample From 3 locations

+ Area 4 523 SF

$$GI = \frac{\left(\frac{A}{\pi}\right)^{0.5}}{2} = 6.45'$$

USE GI = 6.5'

\* 8 Grid Points

Sample From 4 location

Background Samples: For Toxic Metal 4 Background samples will be taken to establish the background confidence interval

APPENDIX D

CLOSURE PLAN CERTIFICATION  
STATEMENT

Attachment 5

This statement is to be completed and attached to each of the six (6) copies of the closure plan. At least one of the copies must contain original signatures.

Closure Plan  
Certification Statement

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

IND009549598  
U.S. EPA I.D. Number

Johnson Controls, Inc.  
Facility Name

Joseph H. McCorkel  
Signature of Owner/Operator

Joseph H. McCorkel - Plant Engineering  
Name and Title Manager

10/26/90  
Date